



Thomas E. McMahon



Professor of Fisheries

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Education and Experience Teaching/Courses

Current Research & Other Projects Publications and Reports

Professional Service Graduate Students

Advice for Prospective Graduate Students

Fast Links

Education and Experience:

BA, University of California-Santa Barbara, Aquatic Biology, 1975

MS, University of Arizona, Fisheries Science, 1978

PhD, University of Arizona, 1984

2003-present Professor of Fisheries, Montana State University

2006-07 Sabbatical Appointment: Fall 2006: University of Washington, School of Ocean and Fishery Sciences
 (sponsor: Dr. Thomas Quinn)

 Spring 2007: University of Arizona, School of Renewable Natural Resources
 (sponsor: Dr. William Matter)

1997-2002 Associate Professor

1990-1996 Assistant Professor of Fisheries, Fish and Wildlife Program, Montana State University

1987-90 Assistant Professor, Oregon State University, and Coordinator, Fisheries, Forestry & Wildlife
 Project, Coastal Oregon Productivity Enhancement (COPE) Program, College of Forestry and
 Marine Science Center, Newport, OR

1984-87 Postdoctoral Fellow/Visiting Scientist, Pacific Biological Station, Carnation Creek
 Fish-Forestry Project, Canada Department of Fisheries and Oceans, Nanaimo, British Columbia

(Supervisor: Dr Gordon Hartmant)

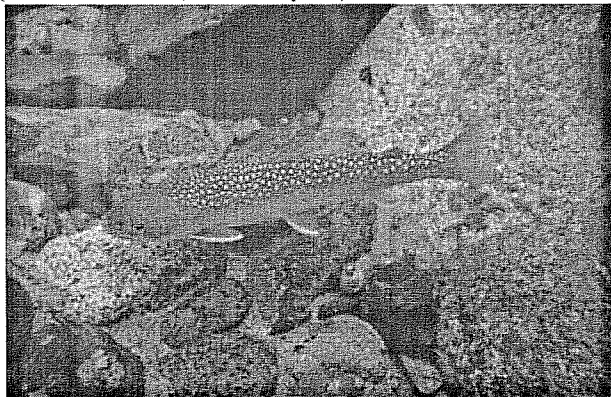
- 1979-84..... Fishery Biologist, Habitat Evaluation Program, U.S. Fish and Wildlife Service,National Ecology Center, Fort Collins, Colorado
 - 1978..... Fishery Technician, LaGrande, OR
 - 1976-78..... Graduate Research Assistant, U of Arizona
 - 1975..... Fishery Technician, Juneau, AK
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Courses : LINK TO COURSE WEBPAGES

- **FALL**
 - **Introduction to Fish and Wildlife, FWL 201**
 - **Research Methods and the Scientific Process, BIOL 525**
 - **SPRING**
 - **Principles of Fish and Wildlife Management, FWL 301, co-taught with Bob Garrott**
 - **Fish Habitat Management, FWL 513, Odd numbered years**
 - **Topics in Fish Ecology, BIOL 452, Even numbered years**
 - **ON DEMAND**
 - **Undergraduate Internship, FWL 476**
 - **SUMMER**
 - **Ecology of Trout Streams, BIOL 580, summer class part of MSU MS in Science Education major for high school science teachers, co-taught with Billie Kerans**
 - **Teaching Improvement Grant: "Enhancing Active Learning in the Natural Resource Sciences-A Seminar Series" Coordinators: T. McMahon, J. Wraith, and R. Garrott, 1998-2000**
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Research

(Bitterroot bull trout, M.Jakober photo)



My interest is conducting applied research directly related to current questions in fisheries management as well as testing ecological principles on which fishery management is based.

Interest Areas:

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|--|----------------------------|
| stream salmonid ecology and management | whirling disease |
| conservation of native fishes | life history/otolith |
| microchemistry of salmonids | |
| winter ecology of salmonids | fish-forestry interactions |
| fish passage at road culverts | |

Current/Recent Projects:

- **Thermal Requirements of Westslope Cutthroat Trout** (Wild Fish Habitat Initiative, Montana Water Center,
- **Factors Affecting the Relative Abundance of Migratory and Resident Life History Forms among Bull**

Trout Populations (AVISTA and US Fish and Wildlife Service)

- **Does Fire Favor Nonnative Fishes?** (USFS, Rocky Mountain Research Station, Mike Young, USFS Rocky Mountain Research Station, co-PI)
- **Factors Limiting Recruitment of Wild Rainbow Trout in Hebgen Reservoir, MT** (PPL Montana and Montana FWP)
- **Role of Culverts in Fragmenting Fish Populations within a Large Drainage Basin in Western Montana** (Montana Dept of Transportation, co-PI, Joel Cahoon MSU BioResources Engineering Dept)
- **Interaction of Life History, Fish Size, and Infection Risk on Population-level Effects of Whirling Disease on Missouri River Rainbow Trout** (National Partnership on the Management of Wild and Native Cold Water Fisheries)
- **Growth and Survival Temperature Criteria for Bull Trout** (National Council for Air and Stream Improvement)
- **Susceptibility of Montana's Spring Creeks to Whirling Disease Infection** (Whirling Disease Foundation)
- **Status of Sauger in Montana** (Montana Fish, Wildlife, and Parks)
- **Microchemical Analysis of Otoliths to Determine Life-History Patterns in Interior Salmonids** (US Forest Service, Rocky Mountain Research Station)
- **Origins of Nonnative Lake Trout in Yellowstone National Park using Otolith Microchemistry** (Yellowstone National Park; A. Munro PI)
- **Spawning and Rearing Ecology of Madison River Rainbow Trout in Relation to Whirling Disease Infection Risk** (National Partnership on the Management of Wild and Native Cold Water Fisheries)

Selected Publications, Reports and Presentations

McMahon, T.E., A.V. Zale, F.T. Barrows, J. Selong, and R. Danehy. Temperature and competition between bull trout and brook trout: a test of the elevation refuge hypothesis. Transactions of the American Fisheries Society, in revision.

- Bear, E.A., T.E. McMahon, and A.V. Zale. Comparative thermal requirements of westslope cutthroat trout and rainbow trout: implications to species interactions and development of thermal protection standards. Transactions of the American Fisheries Society, in press.
- McMahon, T., and W.J. Matter. 2006. Linking habitat selection, emigration, and population dynamics of freshwater fishes: a synthesis of ideas and approaches. Invited presentation to International Symposium on Behaviour and Ecology of freshwater fish: Linking Ecology and Individual Behaviour, Danish Institute of Freshwater Fisheries Research, Silkeborg, Denmark. Aug 2004. Ecology of Freshwater Fish 15: 200-210. [PDF](#)
- Zymonas, N.D., and T.E. McMahon. 2006. Effect of pelvic fin ray removal on survival and growth of bull trout. North American Journal of Fisheries Management 26:953-959.
- McMahon, T.E. 2006. Review of NOAA-Fisheries Biological Opinion on Effects of Proposed Central Valley (CA) Project Changes on Listed Fish Species. NOAA Southwest Fisheries Center and Center for Independent Experts. (<http://swr.nmfs.noaa.gov/news/McMahon%20CALFED%20Salmon%20review%20report%20-%20January%2018,%202006.pdf>) [PDF](#)
- Munro, A.R., T.E. McMahon, and J.R. Ruzzycki. 2006. Where did they come from? Natural chemical markers identify source and date of lake trout introduction in Yellowstone Lake. Yellowstone Science 14(2): 4-12. [PDF](#)
- Jaeger, M.E., A.V. Zale, T. E. McMahon, and B.J. Schmitz. 2005. Seasonal movements, habitat use, aggregation, exploitation, and entrainment of sauger in the lower Yellowstone River: an empirical assessment of factors affecting population recovery. North American Journal of Fisheries Management 25:1550-1568. [PDF](#)
- Watschke, D.A., and T.E. McMahon. 2005. A lightweight modification of the McNeil core substrate sampler. Journal of Freshwater Ecology 20:795-797. [PDF](#)
- Munro, A.R., T.E. McMahon, and J.R. Ruzzycki. 2005. Natural chemical markers identify source and date of introduction of an exotic species: lake trout (*Salvelinus namaycush*) in Yellowstone Lake. Canadian Journal of Fisheries and Aquatic Sciences 62:79-87. [PDF](#)

- Hartman, G.F., and T.E. McMahon. 2004. Aspects of fish reproduction and some implications of forestry activities. Pages 143 to 168 IN T.G. Northcote and G.F. Hartman (eds.). Fishes and Forestry- Worldwide Watershed Interactions and Management. Blackwell Science.
- Rich, C.F. Jr., T.E. McMahon, B.E. Rieman, and W.L. Thompson. 2003. Local habitat, watershed, and biotic features associated with bull trout occurrence in Montana streams. Transactions of the American Fisheries Society 132:1053-1064. [PDF](#)
- Munro, A.R., T.E. McMahon, S.A. Leathe, and G. Liknes. 2003. Evaluation of batch marking small rainbow trout with coded wire tags. North American Journal of Fisheries Management 23:601-605. [PDF](#)
- Downing, D.C., T.E. McMahon, B.L. Kerans, and E.R. Vincent. 2002. Relation of spawning and rearing life history of rainbow trout and susceptibility to *Myxobolus cerebralis* infection in the Madison River, Montana. Journal of Aquatic Animal Health 14:191-203. [PDF](#)
- Nelson, M.L., T.E. McMahon, and R.F. Thurow. 2002. Decline of the migratory form in bull charr, *Salvelinus confluentus*, and implications for conservation. Environmental Biology of Fishes 64:321-332. [PDF](#)
- Selong, J.H., T.E. McMahon, A.V. Zale, and F.T. Barrows. 2001. Effect of temperature on growth and survival of bull trout, with application of an improved method for determining thermal tolerance in fishes. Transactions of the American Fisheries Society 130:1026-1037. [PDF](#)
- McMahon, T.E., and W.M. Gardner. 2001. Status of sauger in Montana. Intermountain Journal of Sciences 7:1-21.
- Jakober, M.J., T.E. McMahon, and R.F. Thurow. 2000. Diel habitat partitioning by bull charr and cutthroat trout during fall and winter in Rocky Mountain streams. Environmental Biology of Fishes 59:79-89.
- Jakober, M.J., T.E. McMahon, and R.F. Thurow. 1998. Role of stream ice on fall and winter movements and habitat use by bull trout and cutthroat trout in Montana headwater streams. Transactions of the American Fisheries Society 127:223-235. [PDF](#)
- McMahon, T.E., A.V. Zale, and D.J. Orth. 1996. Aquatic Habitat Measurements. Pages 83-120 IN B. Murphy and D. Willis, (eds.). Fisheries Techniques, 2nd edition. American Fisheries Society.
- McMahon, T.E., and D.H. Bennett. 1996. Walleye and northern pike: boost or bane to Northwest fisheries. Fisheries 21(8):6-13. [PDF](#)
- Dalbey, S.R., T.E. McMahon, and W. Fredenberg. 1996. Effects of electrofishing pulse shape and electrofishing-induced spinal injury on long-term growth and survival of wild rainbow trout. North American Journal of Fisheries Management 16:560-569. (Received best paper award for 1996, NAJFM)
- Magee, J.P., T.E. McMahon, and R.F. Thurow. 1996. Spatial variation in spawning habitat of cutthroat trout in a sediment-rich stream basin. Transactions of the American Fisheries Society 125:768-779.
- Endicott, C.L., and T.E. McMahon. 1996. Development of a TMDL (total maximum daily load) to reduce nonpoint source sediment pollution in Deep Creek, Montana. Montana Dept. of Environmental Quality Rept. 103 pp.
- McMahon, T.E., S.R. Dalbey, S.C. Ireland, J. Magee, and P. Byorth. 1996. Field evaluation of visible implant tag retention by brook trout, cutthroat trout, rainbow trout, and Arctic grayling. North American Journal of Fisheries Management 16:921-925.
- McMahon, T.E., and S.H. Holanov. 1995. Foraging success of largemouth bass *Micropterus salmoides* at different light intensities: implications for time and depth of feeding. Journal of Fish Biology 46: 759-767. [PDF](#)
- McMahon, T. 1992. Potential impacts of the introduction of walleye to the fishery of Canyon Ferry Reservoir and surrounding waters. Montana Fish, Wildlife and Parks Rept.
- McMahon, T.E., and L.B. Holtby. 1992. Behaviour, habitat use, and movements of coho salmon smolts (*Oncorhynchus kisutch*) during seaward migration. Canadian Journal of Fisheries and Aquatic Sciences 49: 1478-1485.
- McMahon, T.E., and D.S. deCalesta. 1990. Effects of fire on fish and wildlife. Pages 233-250 IN J. Walstad (ed.). Natural and Prescribed Fire in Pacific Northwest Forests. Oregon State University Press, Corvallis.
- McMahon, T.E., and G.F. Hartman. 1989. Influence of cover complexity and current velocity on winter habitat use by juvenile coho salmon (*Oncorhynchus kisutch*). Canadian Journal of Fisheries and Aquatic Sciences 46: 1551-1557.
- Holtby, L.B., T.E. McMahon, and J.C. Scrivener. 1989. Stream temperatures and interannual variability in the

- emigration timing of coho salmon smolts and fry and chum salmon fry from Carnation Creek, British Columbia. Canadian Journal of Fisheries and Aquatic Sciences 46: 1396-1405.
- Matter, W.J., R.W. Mannan, E.W. Bianchi, T.E. McMahon, J.H. Menke, and J.C. Tash. 1989. A laboratory approach for studying emigration. Ecology 70: 1543-1546.
- McMahon, T.E., and J.C. Tash. 1988. Experimental analysis of the role of emigration in population regulation of desert pupfish(*Cyprinodon macularius*). Ecology 69: 1871-1883.
 - McMahon, T.E., and G.F. Hartman. 1988. Variation in the degree of silvering of wild coho salmon smolts migrating seaward from Carnation Creek, British Columbia. Journal of Fish Biology 32: 825-833.
 - Hartman, G.F., J.C. Scrivener, and T.E. McMahon. 1987. Saying that logging is either 'good' or 'bad' for fish doesn't tell you how to manage the system. Forestry Chronicle 63: 159-164.
 - McMahon, T.E., and R.R. Miller. 1985. Status of the fishes of the Rio Sonoyta Basin, Arizona and Sonora, Mexico. Proceedings Desert Fishes Council 13-15: 237-245.
 - McMahon, T.E., and J.C. Tash. 1979. Effects of formalin (buffered and unbuffered) and hydrochloric acid on fish otoliths. Copeia 1979: 155-156.
 - McMahon, T.E., and J.C. Tash. 1979. Use of the chemical senses by threadfin shad to detect food, predators, and conspecifics. Journal of Fish Biology 14: 289-296.
 - McMahon, T.E. and B.Kynard. 1979. Avoidance of an antitranspirant by mosquitofish. Southwestern Naturalist 24: 87-92.
 - author/coauthor, Habitat Suitability Models (1982-85) for creek chub, channel catfish, walleye, warmouth, spotted bass, coho salmon, and chum salmon. USFWS Biol. Rept. Series.
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Professional Service/Awards

Appointed member of Future Fisheries Review Board, Montana Fish, Wildlife, and Parks, 2003-present.

- Appointed member of Excellence in Fisheries Education Award committee, 2006-2007.
 - Best Paper award nomination, Journal of Aquatic Animal Health, 2002.
 - Elected Western Division Representative, Education Section, American Fisheries Society, 2003-2005.
 - Elected member, Executive Committee, Montana Chapter, American Fisheries Society, 1996-1999 (consecutive terms for secretary-treasurer, vice president, president, past-pres.).
 - Associate Editor, North American Journal of Fisheries Management, 1996-1998.
 - Fishery Biologist of the Year award, Montana Chapter of the American Fisheries Society, 2002.
 - Best Paper award, North American Journal of Fisheries Management, 1996.
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Current Graduate Students

- **Andy Solcz**, Fish Passage of Yellowstone Cutthroat Trout and Rainbow Trout through Road Culverts, Upper Yellowstone River (MS).
 - **Leo Rosenthal**, Effects of Road Culverts on Eastern Montana Warmwater Fish Assemblages.(MS)
 - **Clint Muhlfeld**, Conservation and Management of Native Salmonid Species in the Upper Flathead River Drainage. (PhD)
 - **Brian Ertel**, Spawning and Rearing Life History and Movement of Yellowstone Cutthroat Trout in the Upper Yellowstone Lake Inlet Tributaries, Yellowstone National Park (MS)
- Science Advisor to Graduate Students in Masters of Science in Science Education Program:**
- **Lisa Hawkins**, science teacher, Taejon High School, Seoul, South Korea
 - **Cary Rosillo**, science teacher, West Palm Beach (FL) middle school

Past Graduate Students (date of MSU degree & present employment)

- **Nik Zymonas** (MS 2006), fishery biologist, Endangered Species Program, New Mexico Game and Fish Department, Santa Fe, NM. Thesis: Factors Affecting the Relative Abundance of Migratory and Resident Life History Forms among Lower Clark Fork River Bull Trout Populations. (Winner 2004 Student Writing Contest, American Fisheries Society for his article "Alternative Lifestyles: Bull Trout Strategies in the Northern Rockies")
 - **Darin Watschke**, (MS 2006), fishery biologist, Custer National Forest, Billings, MT. Thesis:
 - **Clint Sestrich** (MS 2005), fishery biologist, Gallatin National Forest, West Yellowstone, MT. Thesis: Changes in Native and Nonnative Fish Assemblages and Habitat Following Wildfire in the Bitterroot River Basin, Montana. Available at: <http://www.montana.edu/etd/available/>
 - **Beth Bear** (MS 2005), fishery biologist, Wyoming Game and Fish Department, Laramie, WY. Thesis: Effects of Temperature on Survival and Growth of Westslope Cutthroat Trout and Rainbow Trout: Implications for Conservation and Restoration. Available at: <http://www.montana.edu/etd/available>
 - **Drake Burford** (MS 2005), fishery biologist/stream restoration specialist, Aquatic Design & Construction, Livingston, MT. Thesis: An Assessment of Culverts as Fish Passage Barriers in a Montana Drainage Using a Multi-tiered Approach. Available at: <http://www.montana.edu/etd/available>
 - **Andrew Munro** (PhD 2004), postdoctoral fellow in otolith microchemistry at University of Adelaide, School of Ocean Sciences, Australia. Dissertation: Identification of Life History Variation in Salmonids Using Otolith Microchemistry and Scale Patterns: Implications for Illegal Introductions and for Whirling Disease in Missouri River Rainbow Trout. Available at: <http://www.montana.edu/etd/available>
 - **Ryen Aasheim** (MS 2004), Restoration Coordinator, Trout Unlimited, Missoula, MT
 - **Dan Downing** (MS 2000), fishery biologist, Beaverhead-Deerlodge National Forest, Wisdom, MT
 - **Lee Nelson** (MS 1999), westslope cutthroat trout restoration biologist, Montana Fish, Wildlife and Parks, Townsend, MT
 - **Andrew Bowersox** (MS 1998), Syracuse NY high school science teacher
 - **Matt Handy** (MS 1997), Trout Unlimited national headquarters, Virginia
 - **Carol Endicott** (MS 1996), Yellowstone cutthroat trout recovery coordinator, Montana Fish, Wildlife and Par. Livingston MT
 - **Cecil Rich** (MS 1996), Purdue University PhD/Alaska Fish and Game Dept., Habitat Division, Anchorage, AK
 - **Mike Jakober** (MS 1995), fishery biologist, Bitterroot National Forest, Sula, MT
 - **Steve Dalbey** (MS 1994), fishery biologist, Montana FWP, Helena, MT
 - **Jim Magee** (MS 1993), Arctic grayling recovery coordinator, Montana FWP, Dillon, MT
 - **Sue Ireland** (MS 1993), Director of fish and wildlife program, Kootenai Tribe of Idaho
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Advice for Prospective Graduate Students:

(See article by Al Zale et al. "[Getting a Job or Assistantship: How to Surpass the Competition](#)"):

Fish Links

[Montana Chapter American Fisheries Society \(AFS\)](#)--(includes job links)

[AFS homepage](#)--(includes job links)

[Montana Fish, Wildlife, and Parks](#)

[Whirling Disease Foundation](#)

[Wild Trout Lab, Montana State University](#)

[Montana Water Resources Center](#)

Back to the MSU [Fish and Wildlife Program](#), the MSU [Ecology Department](#), or [Montana State University](#).